Assessment of microalbuminuria in patients of essential hypertension

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Abstract

Background: Microalbuminuria is urinary albumin excretion seen in patients with established essential hypertension and is a predictor of higher risk of cardiovascular and renal dysfunction. The present study was conducted to assess microalbuminuria in patients of essential hypertension.

Materials & Methods: 60 patients of essential hypertension of both genders underwent detection of metabolic profile, urine evaluation, echocardiography and MA.

Results: Out of 60 patients, males were 38 and females were 22. Age group 30-40 years had 2, 40-50 years had 6 and 50-60 years had 18 case of MA. The difference was significant (P< 0.05). The mean SBP was 184.2 mm Hg and 152.6 mm Hg and DBP was 110.4 mm Hg and 102.6 mm Hg in MA present and MA absent patients. The difference was significant (P< 0.05).

Conclusion: Authors found that high prevalence of microalbuminuria in patients with essential hypertension.

Keywords: essential hypertension, microalbuminuria, urine

Introduction

Increased urinary excretion of albumin ranging between 30 and 300 mg/d (ie, microalbuminuria) has been found in a relatively large number of patients with essential hypertension [1]. Microalbuminuria (MA), defined as urinary albumin excretion (UAE) in the range of 30–300 mg/24 h, is seen in patients with established essential hypertension and is a predictor of higher risk of cardiovascular and renal dysfunction [2]. A slightly raised levels of albumin well within microalbuminuric range relates to increased cardiovascular risk, i.e., increased risk for myocardial infarction, stroke, cardiovascular death, heart failure, and peripheral vascular resistance [3]. Detection of increased UAE could be the best index of an increased global cardiovascular risk in a given patient. Variations in the prevalence of microalbuminuria between 10% and 40% that have been reported in other studies are likely due to differences in the selection criteria, to the techniques used for the detection of microalbuminuria, and, in some cases, to the small number of patients studied [4]. The pathophysiological mechanisms leading to the development of microalbuminuria are not fully understood [5]. This may be the result of altered intrarenal hemodynamics and may represent, as in insulin-dependent diabetes mellitus, an early feature of renal impairment, or it may be simply a marker of capillary leakiness at the glomerular level and thus reflect generalized atherosclerotic vascular damage [6]. The latter hypothesis is supported by several epidemiological studies that show an association between microalbuminuria and increased morbidity and mortality, especially that caused by cardiovascular disease independently of other risk factors. Recently, interest in the study of microalbuminuria has grown because it may represent a useful and relatively inexpensive clinical tool for the identification of hypertensive patients at higher risk for cardiovascular damage [7]. The present study was conducted to assess microalbuminuria in patients of essential hypertension.
Materials and Methods

The present study was conducted among 60 patients of essential hypertension of both genders. All were informed regarding the study and their consent was obtained. Inclusion criteria were essential hypertension of any grade as defined by the Seventh report of the Joint National Committee 7 (JNC 7) guidelines. Data such as name, age, gender etc. was recorded. A thorough general physical examination was performed. All patients underwent metabolic profile, urine evaluation and echocardiography. MA, defined as UAE in range of 30–300 mg/24 hours, was measured by hemocue albumin technique. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table 1: Distribution of patients

<table>
<thead>
<tr>
<th>Gender</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>60</td>
<td>38</td>
<td>22</td>
</tr>
</tbody>
</table>

Table I shows that out of 60 patients, males were 38 and females were 22.

Table 2: Prevalence of MA and age group

<table>
<thead>
<tr>
<th>Age group (Years)</th>
<th>Number</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-40</td>
<td>2</td>
<td>0.02</td>
</tr>
<tr>
<td>40-50</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>50-60</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

Table II, graph I shows that age group 30-40 years had 2, 40-50 years had 6 and 50-60 years had 18 case of MA. The difference was significant (P< 0.05).

Discussion

Hypertension is a disorder of circulatory regulation. Sustained hypertension causes accelerated atherosclerosis with consequent coronary heart disease (CHD), heart failure, and stroke and renal failure. If untreated, approximately 50% of patients develop heart disease, 33% develop stroke, and 10%–15% develop renal failure. Agewall et al. reported an ≈23% prevalence of microalbuminuria in a population of hypertensive patients who were selected as at high risk for cardiovascular disease. Age and race seem to exert a significant influence on urinary albumin excretion and may account for some of the variability reported in the literature. The present study was conducted to assess microalbuminuria in patients of essential hypertension. In present study, out of 60 patients, males were 38 and females were 22. We found that age group 30-40 years had 2, 40-50 years had 6 and 50-60 years had 18 case of MA. Jalal et al. in their study of relationship between MA and cardiac structural change in mild hypertensive patients found significant correlation between UAE and cardiac structural parameters such as IVS (r = 0.71), PSVT (r = 0.64), and LVM (r = 0.65). Those who had MA presented higher values of all cardiac parameters. These data indicate that MA in essential hypertension represents an early marker of cardiac structural abnormalities.

We found that mean SBP was 184.2 mm Hg and 152.6 mm Hg and DBP was 110.4 mm Hg and 102.6 mm Hg in MA present and MA absent patients. Recently, a large clinical trial that involved patients with mild and moderate essential hypertension showed a 6.1% prevalence of microalbuminuria, which is a considerably lower value than previously reported. Maggon et al. in their study 50 treatment-naïve hypertensive patients (16–80 years of age) were prospectively enrolled. MA (defined as urinary albumin excretion in the range of 30–300 mg/24 h) was present in 44% of patients with newly detected essential hypertension. A significant number of patients with MA had abnormally high mean left ventricular mass index as compared to those without MA. In addition, a positive correlation was also observed between MA and LVH. Furthermore, mean CCIMT was found to be higher in patients with MA (P < 0.001), with 69.2% of the patients with MA having elevated mean CCIMT. The CCIMT had a positive correlation with both MA and LVH. This study demonstrates the presence of MA in a significant number of newly detected and untreated patients of essential hypertension. Further, MA had a statistically significant relationship with LVH and CCIMT. Pontremoli et al. included 787 untreated patients with essential hypertension. Albuminuria was measured as the albumin-to-creatinine ratio in three non-consecutive, first morning urine samples. The prevalence of microalbuminuria was 6.7%. Albuminuric patients were more likely to be men and to be characterized by higher blood pressure, body mass index, and uric acid levels and lower HDL cholesterol and HDL cholesterol−to−LDL cholesterol ratio. Piecewise linear regression analysis demonstrated that uric acid and diastolic blood pressure significantly influence albuminuria and together account for a large part of its variations. K-means cluster analysis performed on the entire cohort of patients confirmed that microalbuminuria is associated with a worse cardiovascular risk profile. Furthermore, microalbuminuria was associated with the presence of target organ damage.
(eg, electrocardiographic [ECG] abnormalities and retinal vascular changes). Age and the presence of microalbuminuria act as independent risk factors for the development of ECG abnormalities and retinal vascular changes. Cluster analysis allowed us to identify three subgroups of patients who differed in the presence or absence of microalbuminuria, retinopathy, and ECG abnormalities.

**Conclusion**
Authors found that high prevalence of microalbuminuria in patients with essential hypertension.

**References**